ZOOLOG

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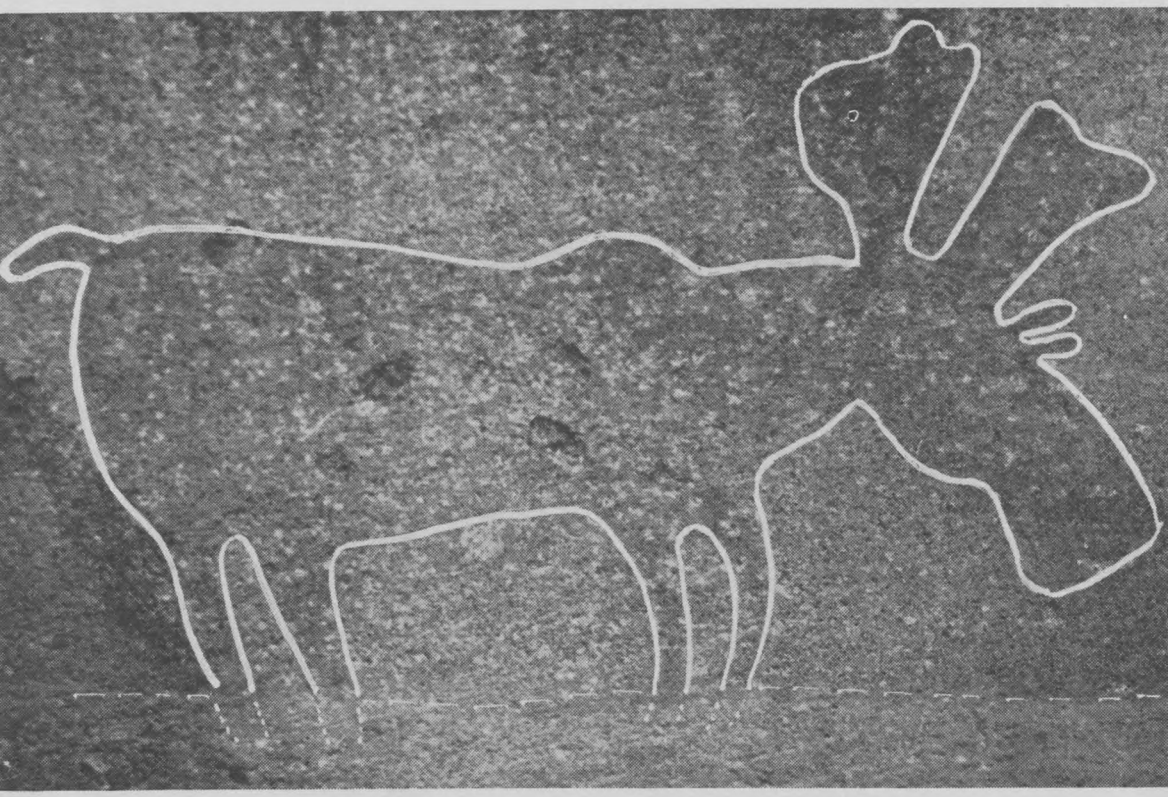

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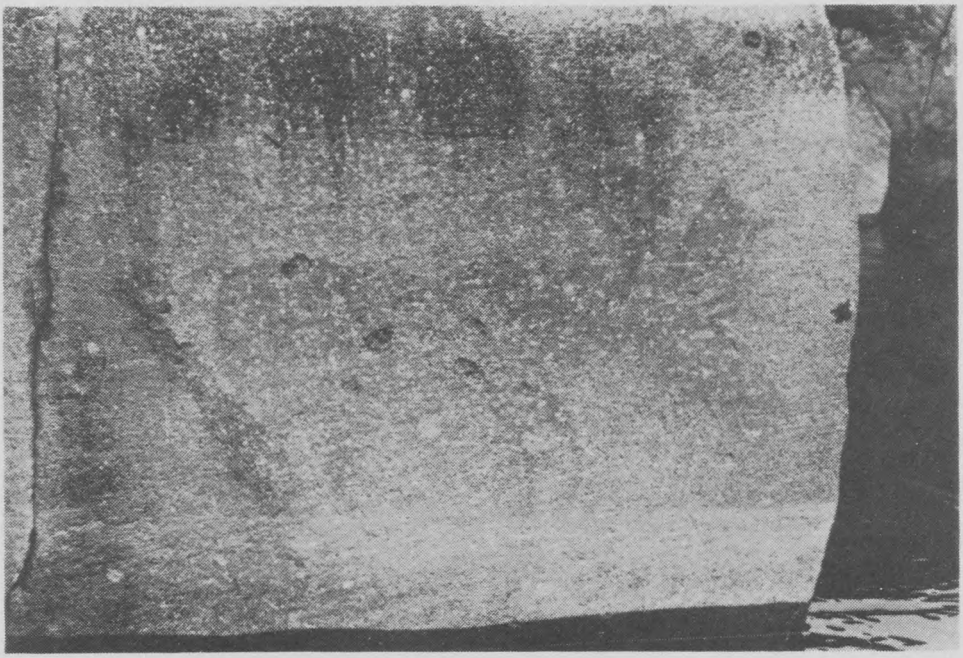
On the Cover

The picture on the cover is Figure #2 of the article: Animal Designs in Rock Paintings. The white outline of the moose is drawn to facilitate recognition. A picture of the pictograph without lines is shown below.



ZOOLOG

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The President's Message

I would like to tell you this month of a very special meeting of the Board of Directors of the Zoological Society which was held several weeks ago, which I believe hits right at the core of one of the reasons why animals are kept in zoos in this modern day and age. Earlier this year I received some correspondence from Prof. Richard Glover who, as many will recall, was the first president of the Zoological Society of Manitoba and who is now at Carleton University in Ottawa. The purpose of his writing me was to call to my attention the fact that this spring some eggs were taken from the nests of whooping cranes in Wood Buffalo Park of Northern Alberta and transported to a special rearing station located at Patuxent, Md. This work was undertaken by the Canadian Wildlife Service and its counterpart in the United States.

Most readers will be aware of the fact that the whooping crane is a species in considerable danger of extinction. The total whooping crane population reached a low point of 15 individuals in 1941 and their numbers are not very much stronger today.

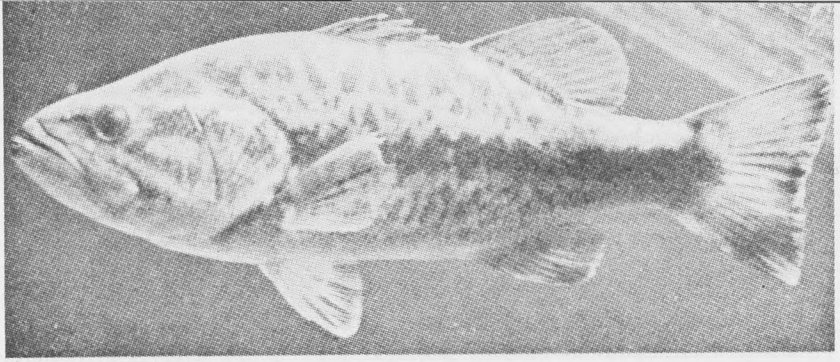
The present area of concern rests in the fact that these birds breed in a fairly limited area along the Alberta-Northwest Territory boundary and winter in the Aransas Refuge of southern Texas. Considerable encroachment by roads, aircraft and industry exists, or potentially exists, to erode both the summer and winter grounds for these birds.

Now, one fact seems to have been established. The whooping crane normally lays two eggs in her nest. Usually only one of these eggs produces a young bird to arrive in the Aransas wintering ground. From the experiment this past summer, it would appear that one egg can be taken with no apparent damage to the wild population. It is possible, then, that on a regular program this species can be propagated in confinement and perhaps even a new wild population established, making use of new summer and wintering ranges.

The challenge to zoos is obvious. While it is probably wise that for the first year or two the efforts toward propagation in captivity of the whooping crane should take place under highly controlled conditions, such as one presumably finds at Patuxent, it is possible that, if the present experiment proves to be successful, zoos, particularly those located in Western Canada near the birds' normal flyway, should be prepared to undertake the propagation of captive stocks of whooping cranes.

While our meeting of the Board of Directors arrived at no conclusions on what should be done, the subject was thoroughly discussed and a body of informed opinion now exists within our Society. We all know that there are certain species of animals today that exist only in zoos. Our own Pere David's deer is an example. Nowhere in the world is Pere David's deer in existence in the wild, nor has it been for several generations. We hope that this will not happen with the whooping crane, but if it does, Zoological parks everywhere in North America may end up being the final repository for the species.

—George Heffelfinger



Michigan Conservation Dept.

Activities of Freshwater Fish in Winter

What do fish do in the winter? This is indeed a very difficult question to answer. The literature is extensive on what fish do in the summer; the reason being that in temperate zones, fisheries investigations are carried on in the summer, when problems such as ice, snow, and cold weather do not interfere with observations and data collecting.

Most freshwater fish in the temperate zones respond to winter by suspending much of their normal feeding activities. They become inactive during the winter, descending to deeper water in lakes and rivers. Some fish, however, as will be mentioned later, are active throughout the winter. Therefore, it is an oversimplification to say that freshwater temperate zone fish "sleep" or "hibernate" in winter.

Under normal conditions the body temperature of fish is about the same as that of the surrounding water. This is due to the fact that fish are "cold blooded" (poikilothermous), and as such they do not require the energy that mammals and birds must spend to maintain their body temperatures within relatively narrow ranges. Some investigators have reported that freshwater fish may, to a slight degree, regulate their body temperatures by being active, reacting to frightening stimuli, or entering a state of dormancy. The bowfin (Amia) and crappies (Pomoxis) can retain body temperatures cooler than the rising water temperatures for many hours.

Because fish are poikilothermous they are more subject to the influence of Van't Hoff's rule than birds and mammals. This means that the rate of reaction is often doubled for each 10°C increase in temperature within certain temperature ranges. Since in temperate zones water temperature may fluctuate 77°F (25°C), a wide range of metabolic rates and food consumption can occur in one fish throughout the year. Nutritional requirements of fish are, therefore, largely dependent on the temperature

Underwater photograph of largemouth bass.

of the surrounding water. A captive trout in winter needs 10% of its body weight in food per week for maintenance but in summer this need is 30%. Bluegill (Lepomis macrochirus) needs less than 1% of its body weight weekly in winter at 36°F (2-3° C), but may take 35% of its body weight weekly at a temperature of 75°F (20°C). Temperate zone fish may actually lose weight in winter, due to the temperature depressing both the amount of food consumed and the metabolic rate of digestion.

The fact that the growth rate of most temperate zone fish decreases in winter is a useful bit of knowledge. The decreased growth rate of various fish can be detected on the scales, otoliths (ear stones), opercular bones, vertebral centra, and fin rays. Thus, the biologist is able to tell by looking at these structures, how many summers and winters the fish has lived and thus arrive at the age of the fish.

The foregoing indicated the general relationships of freshwater temperate zone fish to cooler water as experienced by these fish relative to growth, food requirement, metabolic rate and general behaviour. These general remarks can apply to the fish found in Manitoba as well, since Manitoba is located in the North Temperate Zone. Some reference will be made in the following statements on the winter behaviour of some Manitoba species. These species are not necessarily native to the province but are found in Manitoba due to hatchery distributions.

Lake trout (Salvelinus namaycush) are generally found in the deeper parts of deep lakes in the summer where they avoid the summer temperatures. In fall, usually around the end of September, they rise to shallow water areas where spawning takes place on reefs or shoreline. They remain in these shallow areas, around the reefs, after spawning. Evidence from commercial fishing indicates that they are in moderate depths in early winter and tend to be widely dispersed during the later months of ice cover. It has been suggested that lake trout prefer a temperature of 40°F in the winter.

Walleye (Stizostedion vitreum vitreum), incorrectly called pickerel in Manitoba, are active and feed throughout the winter. This is especially true when ice first forms and again prior to the spring break-up of the ice. The latter activity may be associated with the spring spawning habit of these fish.

Brown trout (Salmo trutta) in streams grow little during the winter. They have a stronger tendency to remain in one location and are less aggressive in the winter than in summer.

Rainbow trout (Salmo gairdneri) and brook trout (Salvelinus fontinalis) in streams are mainly found in pools in spring, summer, and early autumn. In winter they move in shallower, riffle areas under ice cover.

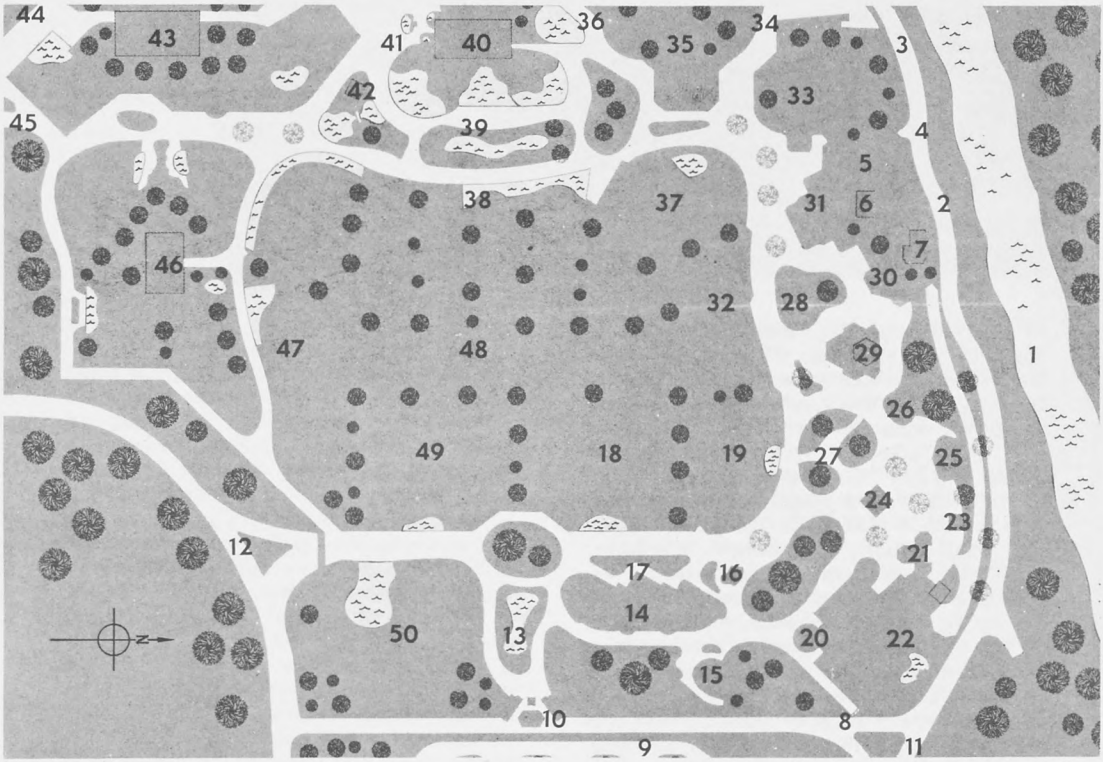
Burbot (Lota lota), also called lawyer fish, ling, freshwater cod, etc., is an unusual fish in that it spawns neither in spring or fall like most other Manitoba fish. In the coldest part of the year, the end of January and the beginning of February, it is actively spawning. Burbot apparently do not feed immediately prior to spawning but commence feeding again after spawning.

Data derived from gill netting in winter indicates that tullibee (Coregonus sp.) also known as lake herring and ciscos are caught at any depth but mainly in water less than 30 feet deep.

Largemouth bass (Micropterus salmoides) are very sensitive to cooler temperatures. In autumn, as the water cools, they feed less and less. During the winter the largemouth bass are relatively inactive.

It would appear that the Manitoba fish in winter have widely differing behaviours, ranging from inactiveness to active feeding, to spawning. Generally though, fish are less active in winter than in summer.

—Rudolf O. Schlick,
Fisheries Biologist,
The Pas, Manitoba.



Our Zoo Animal Collection (5)

Time and time again, when I conduct guided tours through Assiniboine Park Zoo, I am asked: "When are you going to show Elephants? When can we see Giraffes here? Why have you no Rhinos and Hippos? When will you get Penguins and Sea Lions? Where are the Snakes? Do you not have Wolves, Beavers, Musk-oxen, Wolverine, Mountain Goats?" — in about this order of frequency. With sadness I have to admit that none of these attractive creatures are in our present Zoo collection. Accommodations for most of these are planned in our Zoo masterplan of 1959, and all of those animals could be kept well in spite of our severe climate. But I am unable to predict at what time funds for the various necessary animal houses will be provided.

Although there were Wolves and Beavers in our collection until their outdated enclosures had to make room for other developments, it is interesting to note that the "public demand" is greater for large exotic creatures than for any native kinds. However, a Zoo, being an educational and cultural institution, must maintain the proper balance between popular demand and professional guidelines. Assiniboine Park Zoo is historically committed to the exhibition of as great a variety of native animal species as is possible and practical. As early as in 1950, an advisory committee to the Parks Board recommended exhibting the fullest possible range of our Canadian game animals and fur-bearers.

Let us see where we stand in this regard. My references are the atlas of Manitoba game and fur-bearing animals, the map on the middle pages of our Zoo picture book and our Zoo development masterplan.

Polar Bear. Our huge old specimens were sold to Ohio when the bear moats were re-built. We now have four Polar Bears: a nearly three-year-old male from Baffin Island, gift of the Federal Electric Company and the Government of Canada, and three younger females, probably all from Spitzbergen. They can be viewed in the bear exhibits (No. 14 on the Zoo map) and should eventually be shown with other ocean dwellers west of No. 40 on the map; this area, however, is as yet undeveloped.

Black Bear. The common Black Bear can presently be seen in seven specimens, all donated by the Wildlife Branch of the Province. No. 14 on the Zoo map.

Elk or Wapiti. True Manitoba Elk have been kept and bred at our Zoo for many years. Occasionally young specimens were brought in from Riding Mountain Park stock. Our new Elk compound (No. 38 on the Zoo Map) provides excellent viewing of Elk, thanks to the man-made hills in the enclosure. We keep a big bull Elk with three hinds. Young Elk were traded with Zoo-Park Berlin and many American buyers.

Moose. There are presently two pairs of Moose in our collection. The breeding pair is of Saskatchewan and Alberta origin, and the young pair came from British Columbia. The enclosure (No. 50 on the Zoo map) has undergone some improvement and will be further beautified when funds become available.

Barren-Ground Caribou. For the first time in our Zoo's history, two young specimens were offered as a gift by the Department of Indian Affairs and Northern Development from Churchill last summer. One animal died before shipping to Winnipeg could be arranged. The other one, a male, arrived safely and is doing well. The final Caribou exhibit is No. 37 on the Zoo map, but our young Caribou is kept at No. 33 in the company of a female Reindeer of the same age.

Woodland Caribou. A male fawn, "Irk," donation of the Manitoba Wildlife Branch, was successfully raised at our Zoo in 1961. This event was sufficiently unusual to warrant a scientific paper in a mammalogical journal: Voss, G. (1963) Beobachtungen an einem jungen Wald-Caribou, Rangifer caribou sylvestris (Richardson); Zeitschrift fuer Sauegetierkunde 28, 184-186. The animal was sent on loan to the F. Oeming's Alberta Game Farm, where it later sired several captive-born Woodland Caribou calves. In view of the fact that our Zoo will be able to exhibit Woodland Caribou properly from 1968 on, it has been suggested that the Manitoba Wildlife Branch and some adventurous members of our Zoological Society might get together to secure, in the wilderness, and deliver to Winnipeg a few Woodland Caribou fawns as the nucleus for a fine new exhibit at our Zoo.

White-tailed Deer. When I arrived in Winnipeg in 1959, there was a thriving herd of large, northern White-tailed Deer, and our Zoo has carried this tradition on. During the course of the years, several dozen specimens from our herd have been traded with institutions in North America and in Europe. Fawns, illegally picked up in various parts of Manitoba, have usually found their way to our Zoo, thanks to the good offices of the Wildlife Branch. These replenishments of stock were so frequent that the baby-animal zoo, "Aunt Sally's Farm," would show attractive, bottle-fed Deer Fawns every year since its opening in 1959. We had one White-tailed stag that weighted 235 pounds on October 24th, 1961, when it was killed in an accident.

Mule Deer. At present, there are no less than 28 Mule Deer in our collection. We have 5 adult males and 10 adult females, and 13 fawns (7 males and 6 females) were born and raised this year. The health and condition of these animals are excellent. I dare say that it is the healthiest and most thriving herd of Mule Deer anywhere in a Zoological Garden. When these lovely Mule Deer of ours move about on the eroded, boulder-covered hill and the green plains of their new enclosure (No. 37 of the Zoo map), it is one of the finest sights in any Zoo.

We will look at fur-bearing animals from Manitoba in the next issue of ZOOLOG. I report with a great deal of satisfaction that all the "big game animals" of our Province of Manitoba are represented (or, in the case of the Woodland Caribou, have been and will again be represented) in our Assiniboine Park Zoo, and are doing well. A great many of them were received from the Wildlife Branch of the Department of Mines and Natural Resources in Manitoba, and I am grateful.

This contribution is written in recognition of the retiring Director of the Manitoba Wildlife Branch, my advisor and good friend, Gerald W. Malaher.

—Guenter Voss
Dr. ver. nat.

Manitoba's desert, near the Carberry Spruce Hills.

Do we want to preserve this unique area and others like it before it is too late?

A Continuing Centennial Project In

International Biological Programme — Part 2

This is the first active year of the International Biological Programme and Canada—with 14 projects under way—is playing a substantial part in this international research programme designed to give mankind new insight into the problems of survival in a swiftly changing world.

In the article (Zoolog, June 1967) discussing the I.B.P., its general organization was explained and it was noted that the Conservation Subcommittee had recommended that Natural Areas should be preserved because of their importance to biology. Many countries are involved in this plan. For example, the Conservation of Ecosystems Subcommittee in the United States has declared, "that far too much of the animal and plant life of the world is threatened with destruction, owing to population expansion, accelerated communication, industrialization of previously underdeveloped countries and intensification of agriculture, forestry and other land use. The threat to biotas exists in all parts of the world but is most pronounced in tropical and subtropical areas, where recent changes in land use have been especially drastic. Only the specialist fully realizes how extraordinarily restricted are the ranges of many species." Agencies in the U.S.A. are establishing a clearinghouse for collecting, collating and disseminating existing and new information on the major ecosystems of the U.S.A. and, where the ecosystems extend beyond the U.S. boundaries, Canada and Mexico have been invited to participate.

This desire to establish a comprehensive system of protected ecosystems is an international one. In Canada a suggestion was made to the Canadian Council of Resource Ministers that as a Centennial Project 100 ecological reserves be set aside, 10 in each province. They might be called Centennial Reserves.

It is proposed that the Federal and Provincial governments be persuaded to set aside natural areas for biological research. Initially, these sites would be used for measuring biological productivity as defined by the I.B.P. At the conclusion of the programme they would remain available for continuing research by scientists from Canada and other countries. Having been extensively stud-

ct In Conservation

—Dr. Jennifer M. Walker

ied during the I.B.P. the sites would serve as benchmarks for comparison with other areas which might be similarly designated at a later time, and with areas exploited for human use.

Knowledge of biological productivity will not in itself lead to increased productivity useful to man, but such an assessment is basic, indeed quite essential for the development of the applied sciences that will enable us to understand what we are doing with our biological resources and what we can do with them in the future.

What Are We Doing in Manitoba?

An informal meeting was held in April in an attempt to bring together some of the individuals (and organizations) that might be interested and concerned with the preservation for all time, of selected natural areas.

Representatives from 28 organizations were invited and almost all attended — a most encouraging display of interest. The need for an inventory of major ecosystems and an evaluation of existing reserves was stressed together with the necessity for the establishment of priorities in relation to proposed sites (depending on present threats to unique areas, rarity, etc.). A scientific and practical basis for maintenance is absolutely essential. To acquire an area is perhaps one of the easiest steps to take. Its maintenance and possible management will involve careful planning and sustained interest. A committee with representatives from interested organizations should be charged with the responsibility of providing adequate protection for these reserves to prevent their destruction or misuse. The need for interested personnel and funds to support the areas set aside was made clear.

Where Will these Ecological Reserves Be?

At present there are several areas covered by some sort of protection in Manitoba, for example, Provincial and National Parks. Some of the ecological reserves will probably be located within the isolated parts of these already protected areas. Other ecological reserves will be located in undisturbed parts of Manitoba, and represent as many as possible of the varied natural habitats that the Province of Manitoba enjoys. These will range in size from a few acres to many square miles in extent—the average probably being about 5 square miles. And remember, these are being set apart in each of the provinces in Canada, and in each of the 40 countries participating in the International Biological Programme.

Future management of reserves is a difficult problem since in many cases mere protection from human interference will not ensure their preservation in the original form; research may be needed to formulate long range plans.

How Can You Help?

If you are interested in the beauty of nature and in Canada's natural heritage you can help by supporting the I.B.P. and the programme of ecological reserves in Manitoba. If you know of an area in this province which you think should be made into an ecological reserve you should bring this to the attention of:

Canadian Subcommittee on Conservation of Terrestrial Communities,
International Biological Programme,
c/o Dr. Jennifer M. Walker,
Botany Department,
University of Manitoba.

We need **your** help in preparing lists of areas to be evaluated as potential ecological reserves.

REFLECTIONS ON WHITE

With one silent onslaught, the arctic winter has frozen all the grass, the bushes and the trees; the creeks and ponds are there no more; the vast white loneliness has covered all.

In autumn, the grass, the rosebush and the aspen prepared for this when they stored all nourishment within their roots. Most birds went south, and caribou began their wanderings. Some animals retired for a season of forgetful sleep.

The prairie lies orphaned. But not quite.

Out of the snowcovered deadwood a shadow starts. It stops; gets long, then short. Invisible now. It moves again. An ermine has betrayed itself by stirring.

The mournful howl of wolves, the lonesome stealth of the polar bear, the watchful ears of the snowshoe hare, the rustling wings of ptarmigan all say to us that life goes on in the harsh wilderness.

Because the snow protects the mice and lemmings, the arctic hare is much more prone to be attacked by wolves. But, outfitted with a coat of white, remaining still in some small indentation, the arctic hare, when white in snow blends, as he does with earth in his grey-brown of summer.

Among the animals that live in Manitoba and which do turn white with winter's coming are the snowshoe hare and the large whitetail jackrabbit. The latter, in spite of the name, is still a hare. Rabbits give birth to blind, naked and helpless babies which they must nurse for several weeks; whereas the hare's offspring is furry when born, can see and only nurses for some days. Manitoba's only true rabbit is a migrant from the south, the cottontail, easily recognizeable in winter by its brown, rather than white, coat.

Some winter white hunters are the shorttail and the longtail weasel, and the arctic fox. The polar bear shows his environs by his constant coat of white. But what about a female polar bear emerging from a winter's den when all around her vegetation of the northland sprouts? Her bright alarming white is immaterial at this time of plenty. The eggs of birds, young tender leaves, form part of many white bears' diet.

Birds known for their winter whiteness are the rock and willow ptarmigan; and the snowy owl when it comes south in Manitoba for the winter.

From our human viewpoint it seems obvious that the white animals profit from their whiteness in the northern winters: they either hide from being eaten, or they hunt and therefore eat much better. However, let us remember that animals do not see the same way as we, and that we cannot fully grasp the role of protective coloration.

Winter's bright, stark white is really not a color at all. We see white when the colorless (white) daylight is bent and then reflected from surfaces that are between two substances. Thus snow, made up of ice and air, is white; ice by itself is translucent and air, too, lets light through. However, when ice and air meet they'll form a surface capable of reflecting light that otherwise might have gone on, and will, unless this surface is irregular, uneven, so as to scatter light; if not, the light will pierce it, as a window; shatter the window and the remains of glass are white. Hair of the arctic fox beams white because air is trapped within a solid, but clear substance. White feathers appear white because the barbules here are colorless and so plentiful that they cause much diffuse reflection from their surfaces.

What is it that makes animals change to white?

H. M. Fox and G. Vevers in their book, "The Nature of Animal Colors," quote some experiments carried out with the ermine or stoat, our shorttail weasel. A group of six European stoats were divided into two groups; one exposed to cold, the other to warm temperatures. The first group turned duly white and everyone was happy and thought to have found the cause for the turning. That is, until a similar experiment was conducted on the North American continent with

the shorttail weasel and this animal reacted not to temperature, but to decreasing light. The longtail weasel, in a similar trial, turned a lighter shade of brown, instead of white, with variations between different animals. Altogether, the results of investigation of the color change in northern mustelids — weasels and ilk — are inconclusive. One may assume, however, that the change of coloration is brought about by a combination of lower temperature, a lesser amount of daylight, both of them changing the animal's habit of living just enough to produce a moult and with it a change of appearance.

To become white, animals must change their hair or feathers. Pigments that caused the hare's brown coat in summer will have to go away, whereas in many other color adaptations, signals from a creature's eyes will tell the pituitary gland to send some hormone which will influence the cell that keeps the pigment: make it smaller and the brown gets lighter. Surrounding light may also directly influence the pigment.

Alas, it's white the weasel wants and therefore he must moult. The short and longtail weasel do this twice a year and white hair may make its appearance before the second autumn moult begins. The snowshoe hare moults three times in a year. In spring he starts a coat of brown, in early fall he changes to a heavier coat of hair, still brown, and early winter sees him put on white. H. M. Fox and Mr. Vevers think that light's decrease prompts change in our snowshoe hare.

Light, too, induces moult in ptarmigan and tests with Scandinavian willow grouse, our willow ptarmigan, show that this light reduction is the cause, even when temperature stays high.

But winter brings us not only white. Rabbits of The Himalaya turn to black. Black pigment, melanin, quite readily is formed in cooler temperatures, which we see when we observe the Russian rabbit. A domestic species, it is born pure white save for the feet, the tail, the nose and tips of ears. Were we to keep part of the rabbit's rump quite cool while hair is growing, then it too would turn black. But black on nose and feet is not uncommon; have you not ever seen a Siamese cat?

Whether rabbits turn to black or white in winter, our search for answers for our curious minds goes on. Have we solved one of our problems, we'll surely find another, and our lives, more wondrous—as life in the white wilderness—go on.

Dieter H. Schwanke, November 1967

One of the splendid arctic foxes that may be seen at Assiniboine Park Zoo. They are shown north-west of the bear exhibit in an enclosure that serves in summer as the home of the Zoo's marvellous lesser pandas.

Animal Designs in Rock Paintings

5

The Canadian Shield consists, primarily, of lakes, rivers and exposed Pre-Cambrian rock. Mixed and unmixed stands of coniferous and deciduous trees occupy areas where sufficient soil has collected. Soil of any depth is scarce, and, accordingly, the area is almost totally unsuited to agriculture, except for small garden patches found in some communities today.

* * *

The people who occupied the shield area in historic and pre-historic times were hunters and gatherers, exploiting the food resources that occurred naturally. Moose and beaver were the main game animals, supplemented by water fowl and fish. Wild rice and a great variety of berries were the primary objects of gathering, according to the seasonal round. Today, these resources still often form important parts of the Ojibwa and Cree diet.

Imitative magic, conjuring and dreaming formed the nucleus of the religious system, with power vested primarily in the shaman. His power came as a result of direct contact with the supernatural, and his capabilities allowed him to cure or kill, and direct the actions of both man and animal. It was toward these ends that the shaman made use of the pictographs.

Current research among the Northern Ojibwa of Manitoba has revealed much about the use of these paintings by the Shaman. One informant at Bloodvein River stated that they were a form of love medicine.

> "An old man might want a girl. He would get some part of her, even one hair off her head. He would then go into his tent and speak out loud, in the same manner as though the girl were right there with him. He spoke words of love. This caused her to go crazy for him. He then slept and dreamed. He would then dream of an animal that would help him in his romancing. The dream had to be real and not just imagination or making it up. Under these conditions when the figure was painted onto the rock, it was permanent. If it was made up, it soon washed off."

Another man stated that they were hunting medicine.

> "A person would dream of the animal (that he intended to hunt) and if that dream were real, and not just made up, the person would get power from the animal."

Yet another stated that they were used in curing practices.

> "These gravings that you see up the river here; those gravings that were made by old people long time ago. Those were the people that had power to do this. That's why now it stays on and doesn't wash off. That is why it stays on — because they had the power to do it.
>
> Sometimes see, old people there, even the young people there you know, would put about that much tobacco in the water. Then you just sort of talking to it, you ask that graving to give you the power to heal this. So, well, it's said it takes quite a time before this happens. You've got to be very sure to believe this. If you don't believe this, you are just doing this for fun. It doesn't work."

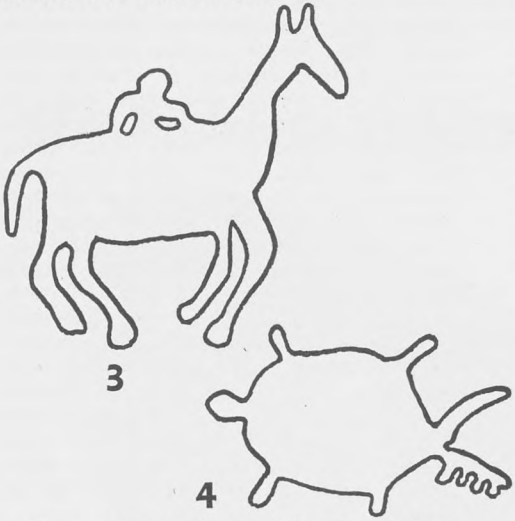
Many of the paintings are representations of animals, although other motifs include men, man-made objects, mythological figures and abstract symbols.

The moose is one of the most common animal representations, and is subject to the widest range of variations. Some are very life-like and others are highly stylized. The moose in Figure 1 is from Lac la Croix in Ontario. The inclusion of a shaft-like object, which appears to protrude from the back of the moose, may represent a form of imitative magic. By painting a moose with a spear or arrow in its body, it is hoped that the same result will be achieved in the hunt.

1

The other moose, in Figure 2, is important in that it is one of the very few to which a date may be given. As can be seen in the photograph, the legs of the moose extend right to the line left during a period of high water. In fact, part of the legs have been obliterated by this rise. Considering the durability of the pigment used, this would indicate that the water must have been at this

high level for a good length of time. Just such a period of high water occurred about A.D. 1350 - A.D. 1400. Moose appeared in Southern Manitoba about A.D. 1000. From these dates we can see that the painting must have been applied between A.D. 1000 and A.D. 1350. It would not be correct to apply this date to all, or even many, of the other paintings, for, as can be seen in Figure 3, a painting of a horse and rider, some were executed in historic times.



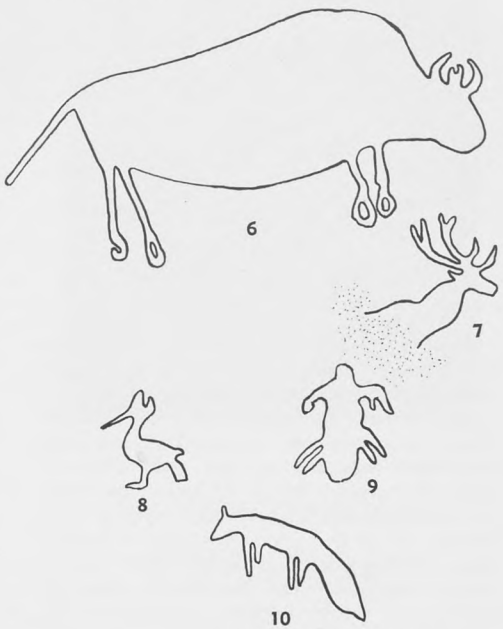
The moose in Figure 2 has been chipped in several places, by hunters shooting at it as they pass downstream. This may be a continuing form of mimetic magic, persisting into the modern Ojibwa hunter's life. While specific data for rock paintings is lacking, such mimetic magic is well documented for historic Ojibwa, the closest similarity being figures scratched into the earth, then ritually shot.

Moose form the most common of the zoomorphic pictographs, and other animal figures rank considerably below it, in terms of frequency. There may be various reasons for this. The moose has been one of the major factors in the economy. Heavy dependence upon it, for food, hides and other material may have led to greater emphasis on moose in magico - religious practices, especially those surrounding the activity of hunting itself. On the other hand, very low frequency of turtle (Figure 4) and snake (Figure 5) representations may be explained in terms of the Indians' traditional ideas about these animals. During the summer of 1967, one of the Hudson's Bay Company employees at Little Grand Rapids had a pet turtle which he usually kept in the house, and away from the store. He did have it in the store one day when an elderly Ojibwa man entered. The man saw the turtle, began to tremble and stammer, and ran out. An informant explained his behavior by saying that the old man, known conjuror and medicine-man, was "keeper of the turtle." He may have meant that the turtle was his spirit helper, his contact with the supernatural.

At Bloodvein, a man was observed to run after a snake, kill it with his feet, and use a stick to fling it far away from his house. Before entering his house, he thoroughly cleaned off his boots. An elderly woman at little Black River once tore the cardboard lining off her house, to satisfy another woman, who was staying with her, that there were no snakes behind the panels. This same elderly woman almost constantly chews a certain root throughout the summer, "to keep the snakes away." Most Ojibwa and Cree are repulsed by snakes. This revulsion and fear may account for a lack of turtle, and snake pictographs.

There have been two bison pictographs recorded and both are many miles north of plains areas, the usual habitat for the bison. The one shown here, in Figure 6, is on the upper Bloodvein River, at least 250 miles north of the plains fringes.

Elk or caribou (Figure 7), bird (Figure 8), insect (beetle? Figure 9) and carnivore (Figure 10) are all minor motifs in pictograph representations. Peculiar is the absence of figures that can be positively identified as beaver, considering the importance of that animal as a food source.



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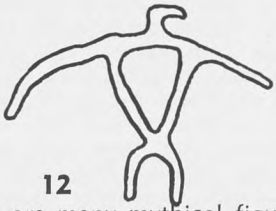
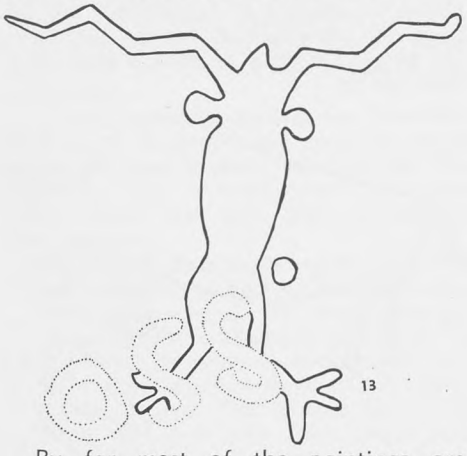


12

There are many mythical figures represented, and it is only at these figures that offerings have been made, usually in the form of ammunition, tobacco, clothing or dishes, pushed into a nearby crack. The "monster" in Figure 11, is from Blindfold Lake, Ontario, the thunderbird, a prominent figure in mythology and ceremony (Figure 12) is from Devil's Bay, Ontario, and the frog-like form (Figure 13) from Lake Sasaginigak, Manitoba. The wavy lines emanating from the head of the Sasaginigak figure have been explained as lines of power, emerging from the figure.



13

By far most of the paintings are located on steep rock faces that form part of river banks, on the shore line of inland lakes, or steep cliffs on islands. Thus far, only one unrecorded painting has been reported on the west shore of Lake Winnipeg. Most of those on rivers are immediately above an area of fast water, or on the upstream side of a portage. Many are at a height that can be easily reached from a canoe, although some are much higher, indicating the use of support or scaffolding, or very high water levels at the time of preparation. It is relatively easy to determine when one is approaching some of the pictograph sites. For, all around it, initials may have been scratched into the lichens, or painted on the rock nearby, or even over the pictographs (Figure 13). These initials may represent, in some cases, an actual perpetuation of the rock painting practice.

A large body of raw data has been collected on pictographs in the Canadian Shield area, but there is still much to know. One major problem is that of dating, either absolute or relative. Except for the moose, and some historical depictions, there have been no positive dates of origination, upon which there has been agreement. One promising method yet to be used, is that of lichenometry. This method depends upon the fixed growth expansion rates of lichens, but variables involved in lichen growth rates (pressure, moisture, sunlight, temperature, wind direction and velocities, rock surface characteristics and composition) have not been satisfactorily collected. Iron oxide, the main pigment used in pictographs, is a severe retardant of lichen growth. Considering that many are partially or almost completely overgrown, a considerable age would be indicated.

Relative dating has been attempted by comparing the intensities of pigment colour, but this may prove inadequate. Runoff, from the cliff-top above the paintings may be acidic in nature, and as it passes over the acid soluble iron oxide, it may cause fading that is out of proportion to its age, when compared to one that did not receive this erosion. One painting may be more exposed to direct wind, rain, wave and ice action than another, and thus appear older when, in fact it is not. Furthermore, different paintings may have just had less pigment applied in their execution.

More work has to be done from an ethrographic approach—gathering opinions pertaining to the paintings from Indians who know them. We must delve deeper into the mythology and legends for clues to the meaning of the paintings and a greater understanding of the attitudes that would compel men, even today, to make offerings to the mythical figures.

Some of this work has to be done immediately. When the Nelson River Project is completed, the water levels of much of Manitoba's north will rise, and with the rising, the paintings will be lost forever.

—Douglas Elias
Jack Steinbring

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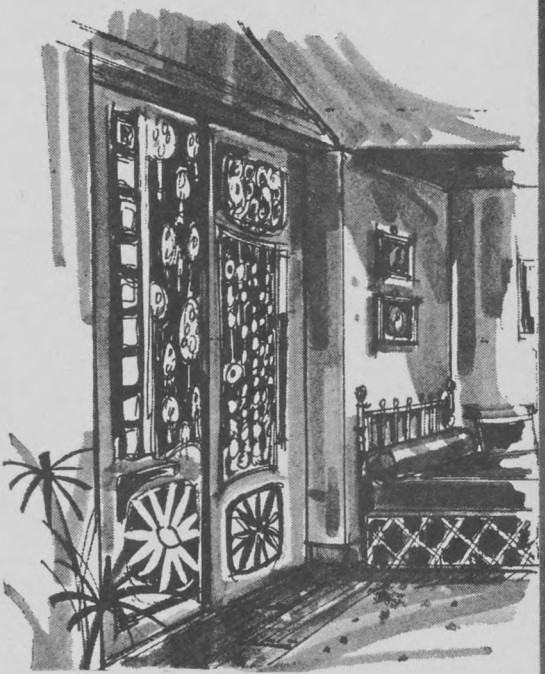

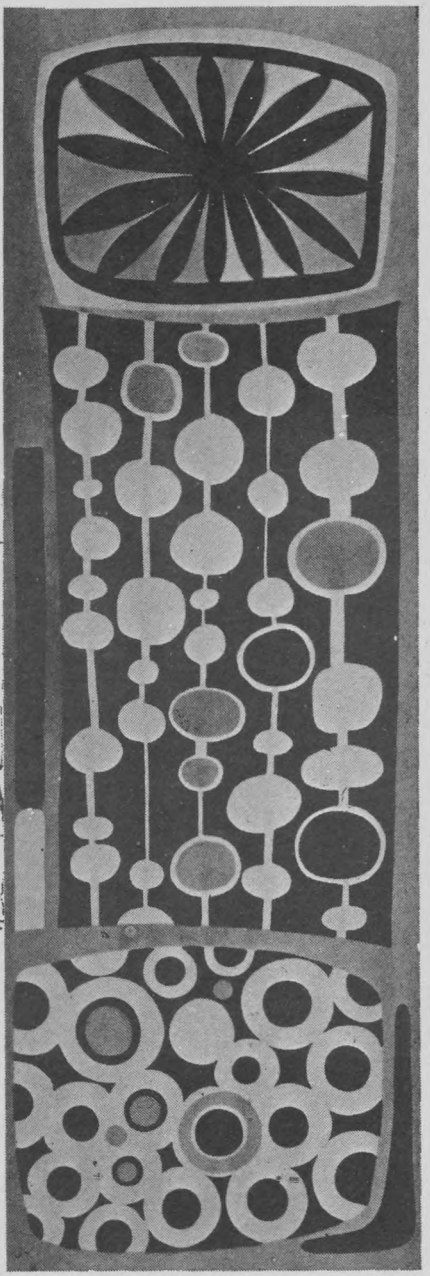

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